

1 1. A method for producing a semiconductor device
2 comprising steps of:
3 providing a mixture of thermoplastic resin component
4 and thermosetting resin component between constituent
5 parts;
6 heating at a temperature greater than a melting
7 temperature of said thermoplastic resin component;
8 applying pressure to said mixture so that it spreads
9 through a space between said constituent parts;
10 completing a melt bonding of said constituent parts
11 through a cooling contraction of said thermoplastic resin
12 component; and
13 heating at a temperature less than a melt bond
14 temperature of said thermoplastic resin component to cure
15 said thermosetting resin component.

1 2. A method for producing a semiconductor device
2 comprising steps of:
3 providing a mixture of thermoplastic resin component
4 and thermosetting resin component between a semiconductor
5 element and a substrate;
6 heating at a temperature greater than a melting
7 temperature of said thermoplastic resin component;
8 applying pressure to said mixture so that it spreads
9 through a space between said semiconductor element and said
10 substrate;
11 completing a melt bonding of said semiconductor

12 element and said substrate through a cooling contraction of
13 said thermoplastic resin component; and
14 heating at a temperature less than a melt bond
15 temperature of said thermoplastic resin component to cure
16 said thermosetting resin component.

1 3. A method for producing a semiconductor device
2 according to claim 1, wherein
3 a melting temperature of said thermoplastic resin is
4 greater than a glass transition temperature of said
5 thermosetting resin.

1 4. A method for producing a semiconductor device
2 according to claim 2, wherein
3 a melting temperature of said thermoplastic resin is
4 greater than a glass transition temperature of said
5 thermosetting resin.

1 5. A method for producing a semiconductor device
2 according to claim 3, wherein
3 $X \cdot E_1 \cdot \alpha_1 < (1-X) \cdot E_2 \cdot \alpha_2$ holds, where
4 E_1 is a modulus of elasticity of said thermoplastic
5 resin,
6 α_1 is a coefficient of thermal expansion of said
7 thermoplastic resin,
8 E_2 is a modulus of elasticity of said thermosetting
9 resin,

10 α_2 is a coefficient of thermal expansion of said
11 thermosetting resin, and
12 X is a content by percentage of said thermoplastic
13 resin in said mixture and $0 < X < 1$.

1 6. A method for producing a semiconductor device
2 according to claim 4, wherein
3 $X \cdot E_1 \cdot \alpha_1 < (1-X) \cdot E_2 \cdot \alpha_2$ holds, where
4 E_1 is a modulus of elasticity of said thermoplastic
5 resin,
6 α_1 is a coefficient of thermal expansion of said
7 thermoplastic resin,
8 E_2 is a modulus of elasticity of said thermosetting
9 resin,
10 α_2 is a coefficient of thermal expansion of said
11 thermosetting resin, and
12 X is a content by percentage of said thermoplastic
13 resin in said mixture and $0 < X < 1$.

1 7. A method for producing a semiconductor device
2 according to claim 5, wherein
3 the modulus of elasticity E_1 of said thermoplastic
4 resin is less than the modulus of elasticity E_2 of said
5 thermosetting resin.

1 8. A method for producing a semiconductor device
2 according to claim 6, wherein

3 the modulus of elasticity E_1 of said thermoplastic
4 resin is less than the modulus of elasticity E_2 of said
5 thermosetting resin.

1 9. A method for producing a semiconductor device
2 according to claim 5, wherein
3 said X is in a range from 0.4 to 0.6.

1 10. A method for producing a semiconductor device
2 according to claim 6, wherein
3 said X is in a range from 0.4 to 0.6.

1 11. A method for producing a semiconductor device
2 according to claim 1, wherein
3 said thermoplastic resin is thermoplastic polyimide
4 resin and said thermosetting resin is epoxy resin.

1 12. A method for producing a semiconductor device
2 according to claim 2, wherein
3 said thermoplastic resin is thermoplastic polyimide
4 resin and said thermosetting resin is epoxy resin.